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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: UTSUMI et al

Serial No.: 10/629,711

Filed: July 30, 2003

For: Active Matrix Type Liquid Crystal Display Apparatus

Art Unit: 2871

Examiner: J. Dudek

DECLARATION UNDER 37 CFR 1.132

Mail Stop: BOX AF Amendment (Fee)

Commissioner For Patents

P. O. Box 1450

Alexandria, VA 22313-1450

Sir:

I, Yasushi Tomioka, a Japanese citizen, residing at Ishikawa-cho, Hitachinaka, Ibaraki, hereby declare that:

I graduated from Tohoku University.

I began employment with Hitachi, Ltd., the assignee of the above-identified application in April 1, 1984 and have been involved in Hitachi Research Lab.

I have read and am familiar with the above-identified application and the Office Action dated June 30, 2006 rejecting claims based upon the cited art of Bahadur taken alone or in combination with Matsumoto.

The claimed invention is directed to a liquid crystal display apparatus having a liquid crystal panel including a pair of polarizers, and a back light having a light source provided at a backside of the liquid crystal panel, as illustrated in Fin. 1 of the drawings of the application. As described and claimed, the liquid crystal panel is an active matrix type liquid crystal panel enabling display in a double refraction mode, and has a characteristic of spectral transmittance required to satisfy at least the equation of $x > z$, when a drive voltage is applied thereto so as to vary at all voltages of the drive voltage, either from a dark state to a light state or in the range of a minimum voltage required for a visual display on the liquid crystal panel to a maximum voltage. As disclosed "x" is a

value of the transmittance in the liquid crystal panel at a wavelength which corresponds to a longest wavelength in the range of wavelengths designated for blue light illuminated from the light source, and "z" is a value of the transmittance in the liquid crystal panel at a wavelength which corresponds to a maximum value of the intensity in the range of wavelengths designated for red light illuminated from the light source. Further, the liquid crystal panel has a characteristic of spectral transmittance required to satisfy the equation x > y > z, where "y" is a value of the transmittance in the liquid crystal panel at a wavelength which corresponds to a maximum value of the intensity in the range of wavelengths designated for green light illuminated from the light source. Such features are illustrated in Fig. 32 of the drawings of this application, for example, wherein the characteristic of spectral transmittance is obtained at all voltages of the drive voltage in the range indicated as recited in the claims of this application.

I have reviewed the cited art of Bahadur, as utilized in rejecting claims 11-13, and in particular, Fig. 10.34 at page 266 of this cited art, which illustrates properties of a cell (D-STN). The liquid display panel, referred to by the Examiner, in Bahadur is of the STN type, which is a passive type of liquid display panel and not an active matrix type of the liquid crystal panel, which active matrix type as recited in claims 11 – 13 of the above-identified application. Thus, Bahadur in Fig. 10.34 at page 266 does not disclose or teach an active matrix type of liquid crystal panel and it is my opinion that based upon the disclosure of Fig. 10.34 of Bahadur, it would not be obvious to provide an active matrix type liquid crystal panel from such disclosure.

In rejecting other claims of this application, the Examiner combines Bahadur with Matsumoto, indicating that Matsumoto discloses the active matrix technique, and one of ordinary skill would have found reason, motivation, and suggestion to modify the device of Bahadur to employ an active matrix type driving matrix. Contrary to the position set forth by the Examiner, it is my opinion that would not be obvious to modify the passive type display of Bahadur based upon the disclosure of Matsumoto directed to an active matrix type display for the following reasons:

> "An STN layer used in a STN type display is different from a liquid crystal layer used in an active matrix type liquid crystal display."

For example, an STN layer is very responsive to drive voltages. This characteristic is shown in Fig. 10.33 of Bahadur at page 265, wherein it is

illustrated that the transmitted luminance of the STN layer is changed sharply. As indicated, a minimum transmittance with an applied voltage of 1.6 is changed to a maximum transmittance with an applied voltage of 1.8, which represents a minimum-maximum change of transmittance being performed in m-voltage order (in Fig. 10.33 on the order of 200 mV).

In an active matrix type display, the transmittance of liquid crystal layer is usually divided into 256 levels, which means an applied voltage is divided into 256 levels between minimum-maximum voltages. Thus, if an STN layer, as shown in Bahadur, is applied to an active matrix type display, it is required to adjust an applied voltage within 1mV or less. In an active matrix type display, many TFT are used to adjust an applied voltage of each pixel. Because the characteristic of each TFT is not completely the same, it is impossible to adjust an applied voltage within 1mV or less.

Therefore, it is not practical to attempt to modify the device of Bahadur to employ an active matrix type, as disclosed in Matsumoto. Alternatively, if the device of Bahadur is modified to employ an active matrix type, the transmission spectra of the STN layer, which is shown in Fig. 10.34 of Bahadur, must be changed. Thus, not only would one of ordinary skill in the art not have found reason, motivation and suggestion to modify the device of Bahadur to employ an active matrix type driving matrix, as suggested by the Examiner, but any such modification would not provide the spectral transmittance characteristic of Fig. 10.34 of Bahadur, as a result of such modification.

Furthermore, the disclosure in Bahadur in relation to Fig. 10.34 is directed to a double layer super twist display D-STN rather than a single layer STN display.

Thus, it is my opinion that Bahadur does not disclose or teach an active matrix type liquid crystal panel in Fig. 10.34 thereof which is referred to by the Examiner in the Office Action dated June 30, 2006, and it is not obvious to one of ordinary skill in the art to modify Bahadur, which discloses a passive type display, to form such into an active matrix type display, and to obtain the spectral transmittance characteristic satisfying the recited equations, when a drive voltage is applied thereto so as to vary at all voltages of the drive voltage from a dark state to a light state or in the range of a minimum voltage required for a visual display on the liquid crystal panel to a maximum voltage.

The undersigned declares that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Sept. 27, 2006
Date

Yasuoki Tomioka
By: